Chapter Four
ALTERNATIVES

ALTERNATIVES

The previous chapters have focused on the available facilities, the existing and potential future demand, as well as quantified the level of facilities that are needed both now and in the future. The purpose of this chapter is to formulate and examine rational airport development alternatives that can address the planning horizon demand levels. Because there are literally a multitude of possibilities and combinations thereof, intuitive judgment is necessary to focus in on those opportunities which have the greatest potential for success.

The major functional areas of an airport must be considered in the formulation of alternatives. At Seligman Airport, these include the airfield and landside general aviation facilities. In addition, operational support facilities and surface access for all these functions must be considered. The interrelationships of these functional areas require that they be evaluated both separately and as a whole to ensure the most functionally efficient, cost-effective, and environmentally-compatible plan is derived. With this information, as well as the input and direction from government agencies, airport users, and other local stakeholders, a basic airport concept can evolve into a realistic development plan.

ISSUE CONSIDERATIONS

The primary goal for Yavapai County and airport management is to develop and operate the airport as an efficient and fully functional general aviation facility, to meet the needs of a relatively remote region. With this designation, the goals for developing the airport should consider providing adequate facilities to meet the general aviation

operator demands in the Seligman region. Specifically, the airport should consider the needs of general aviation piston aircraft up to airport reference code (ARC) B-II. **Table 4A** outlines FAA design criteria, while **Exhibit 4A** presents alternative issues.

TABLE 4A
Airfield Design Standards
Seligman Airport

Critical Aircraft	***B-I (small)***	***B-I***	***B-II***
Runway Length	*4,800'*	*4,800'*	*6,700'*
Runway Width	*60'*	*60'*	*75'*
Taxiway Width	35'	35'	35'
Blastpad (width x length)	*80' x 60'*	*80' x 100'*	*95' x 150'*
Building Restriction Line (BRL)			
Not Lower than One-Mile Visibility Minimums	495'	495'	495'
Runway Safety Area (RSA)			
Width	*120'*	*120'*	*150'*
Length Beyond Runway End	*240'*	*240'*	*300'*
Object Free Area (OFA)			
Width	*250'*	*400'*	*500'*
Length Beyond Runway End	*240'*	*240'*	*300'*
Runway Protection Zone (RPZ) >= one-mile visibility			
Inner Width	250'	500'	500'
Outer Width	400'	700'	700'
Length	1,000'	1,000	1,000
Threshold Siting Surfaces (TSS)			
Visual of Not Lower than one mile (daytime only)			
Beginning point from Runway End	0'	0'	0'
Inner Width	400'	400'	400'
Outer Width	1,000'	1,000'	1,000'
Length	1,500	1,500	1,500
Approach Slope Clearance Required	20:1	20:1	20:1
Nighttime Approaches			
Beginning point from Runway End	200'	200'	200'
Inner Width	800'	800'	800'
Outer Width	3,800'	3,800'	3,800'
Length	10,000'	10,000'	10,000'
Approach Slope Clearance Required	20:1	20:1	20:1

Source: FAA Advisory Circular 5300-13, Change 7, Airport Design

The table depicts applicable airport design standards for the airport under three design scenarios, with differences italicized. First, the airport could be designed for small aircraft exclusively (aircraft weighing less than 12,500

02MP20-4A-1/7/04

AIRSIDE ISSUES

- ☑ Airport Design and Related Criteria
- ☑ Upgrade form ARC B-I to ARC B-II
- ☑ Improve Northern OFA for ARC B-II
- ☑ Improve the Southern RSA/OFA/Reroute Drainage Channel
- ☑ Extend Runway 4-22 to 6,700 feet
- ☑ Instrument Approach Capability
- ☑ Land Acquisition

LANDSIDE ISSUES

- ☑ Develop Airport Terminal Building
- ☑ Develop Hangars, Conventional and T-Hangars
- ☑ Install Fuel Farm Including Self-Service Capability

SELIGMAN AIRPORT

Exhibit 4A
ALTERNATIVE ISSUES

pounds) within approach categories A and B. In general, this is the case currently. The second consideration is for all ARC B-I aircraft, as few weigh more than 12,500 pounds. Lastly, consideration should be given to the standards for ARC B-II aircraft. ARC B-II aircraft were outlined in the previous chapter as the potential future critical aircraft. The differences of each category design will be depicted in the following sections.

Runway 4-22 is currently 4,800 feet long by 75 feet wide. Analysis in the previous chapter indicated that the current length of the runway is adequate to accommodate the majority of aircraft operating at the airport, but falls short for ARC B-II aircraft. For B-II aircraft such as Beechcraft King Air and small business jets, however, the runway length should be at least 6,700 feet. Alternatives presented in the next section analyze future runway extension potentials.

Consideration must also be given to maintaining adequate object free areas (OFA) and runway safety areas (RSA). The Federal Aviation Administration (FAA) defines the OFA as "a two-dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The RSA is defined as "a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway."

Furthermore, the FAA has placed a higher significance on maintaining adequate RSAs at all airports, due to recent aircraft accidents. Under Order 5200.8, the FAA established a Runway Safety Area Program. The Order states, "The goal of the Runway Safety Area Program is that all RSAs at federally obligated airports and all RSAs at airports certificated under 14 CFR Part 139 shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practical." Under the Order, each regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at federally obligated airports.

Currently, Runway 4-22 does not provide the full RSA beyond the northeast end of the runway. A drainage channel interrupts the RSA and OFA approximately 20 feet short of meeting ARC B-I standards. The County plans to replace the ditch with a culvert or reroute the ditch in the future. If the airport is to receive future federal grant funding assistance, the RSA must first be improved.

It should be noted that the southwestern OFA (ARC B-I standards) is obstructed by the perimeter fence approximately 40 feet short of standard. The fence has been planned to be relocated in the future. Alternatives in the following section will consider meeting RSA and OFA standards.

Future planning should consider the potential of receiving an instrument approach to the runway, providing not

lower than one-mile visibility. Given its remote location and use of the airport by Embry-Riddle Aeronautical University (ERAU), Seligman Airport should be served by at least one GPS approach. It is likely that this approach would be better served on Runway 22. Wind patterns are nearly even, however, slightly favoring Runway 22. Also, the location of a railroad line and major thoroughfares could pose as obstructions to an approach to Runway 4.

On the landside, consideration must be given to providing hangar space for a wide variety of general aviation needs. This includes hangar storage for small single engine aircraft to larger corporate aircraft such as medical evacuation flights or visiting business jets. Ultimate development must also consider the most practical, yet beneficial use of lands for specific hangar uses (e.g., T-hangars versus executive or conventional hangars).

Another consideration will be support facilities. The airport is not served by a terminal building, only a public restroom and a pay phone. Future consideration should be given to developing a terminal building large enough to provide shelter, restrooms, briefing room (weather data), and vending machines. Other support facility considerations include siting a fuel farm (current need for Avgas, ultimate need for Jet A fuel), weather facility, and a wash rack. These facilities will play an important role in meeting future aviation demand requirements.

NON-DEVELOPMENT ALTERNATIVES

Non-development alternatives include the no action or “do nothing” alternative, transferring service to an existing airport, or developing an airport at a new location. These alternatives need to be examined first to determine whether future development of Seligman Airport is in the best interest of Yavapai County and the region as a whole.

NO ACTION ALTERNATIVE

The no action or "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the region.

One of the key considerations of this Master Plan is the potential for providing additional runway length to better accommodate medical evacuation aircraft and small business jets projected to use Seligman Airport. Another consideration is providing hangar space, terminal space, and fueling services to meet future demand. A no action approach would ignore the needs of existing aircraft and future airport operators.

AIRPORT CLOSURE

The alternative of shifting all aviation services to another existing airport and closing Seligman Airport was found even less desirable due to the impact on both the existing airport users and residents in the region. The remote location demands a functional facility capable of, at a minimum, providing for medical evacuation needs.

Shifting or closing the Seligman Airport would be a disservice to the residents in the region which currently use or could have need for the airport. Seligman Airport provides an invaluable link with major metropolitan areas which highways, interstates, and other roadways cannot match. Furthermore, relocating demand or closing the airport would represent a significant waste of recently expended funds (both State and County). For these reasons, closure of the airport is not considered a viable option.

CONSTRUCT NEW AIRPORT

Another option would be constructing a new airport. From social, political, and environmental standpoints, the commitment of a new large land area must also be considered. There has been significant opposition in the past to attempts to develop new airports. Furthermore, the development of a new airport similar to Seligman Airport would likely take a minimum of five years to become a reality. The potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site. To develop a new site with the capabilities of Seligman Airport could easily cost more than $10 million, and would not provide the strategic location that Seligman Airport does today.

AIRFIELD ALTERNATIVES

The facility requirements analysis in the previous chapter indicated that the runway should be extended to better meet the needs of aircraft currently operating at the airport. While more options may be available, the analysis considers four airfield alternatives. Two alternatives are considered not feasible, while two are feasible.

AIRFIELD ALTERNATIVE 1

Exhibit 4B presents Alternative 1, which considers that the airport's critical aircraft does not change. If this were to occur, the airport would need to conform to ARC B-I standards. Planning for ARC B-I allows for two conditions: use by small aircraft exclusively (weighing less than 12,500 pounds) or all B-I aircraft, including those weighing more than 12,500 pounds.

The exhibit is a split screen, depicting design standards for each condition. The top frame depicts criteria for ARC B-I, small aircraft exclusively, while the bottom depicts full ARC B-I standards. It is important that the airport conform to the most applicable standard, as applying a more restrictive standard could require additional expenditures

(e.g., facility improvements) not necessary with the more appropriate standard.

There are two primary differences in these design scenarios. The greatest difference is the OFA. The OFA for ARC B-I small aircraft exclusively is not as wide as the full ARC B-I standard and remains unobstructed, except for the portion extending off airport property to the northeast (as does the RSA). To meet full ARC B-I standards, the OFA and RSA are obstructed at the northeast end by fence, but the OFA is also obstructed at the southwest corner and along the western edge by fence.

It should be noted that the OFA can, in cases, be allowed to be outside airport property if no obstructions currently or would ever likely exist. The RSA should always be within airport property. Thus, at a minimum, land acquisition to the northeast is required for both scenarios to maintain adequate RSA. The OFA along the southwestern to south-central portions of the runway for the full ARC B-I design scenario may not need to be acquired, as the land may never be developed (owned by the Navajo Nation and operated as a ranch). The airport property fence, however, is an obstruction to the OFA.

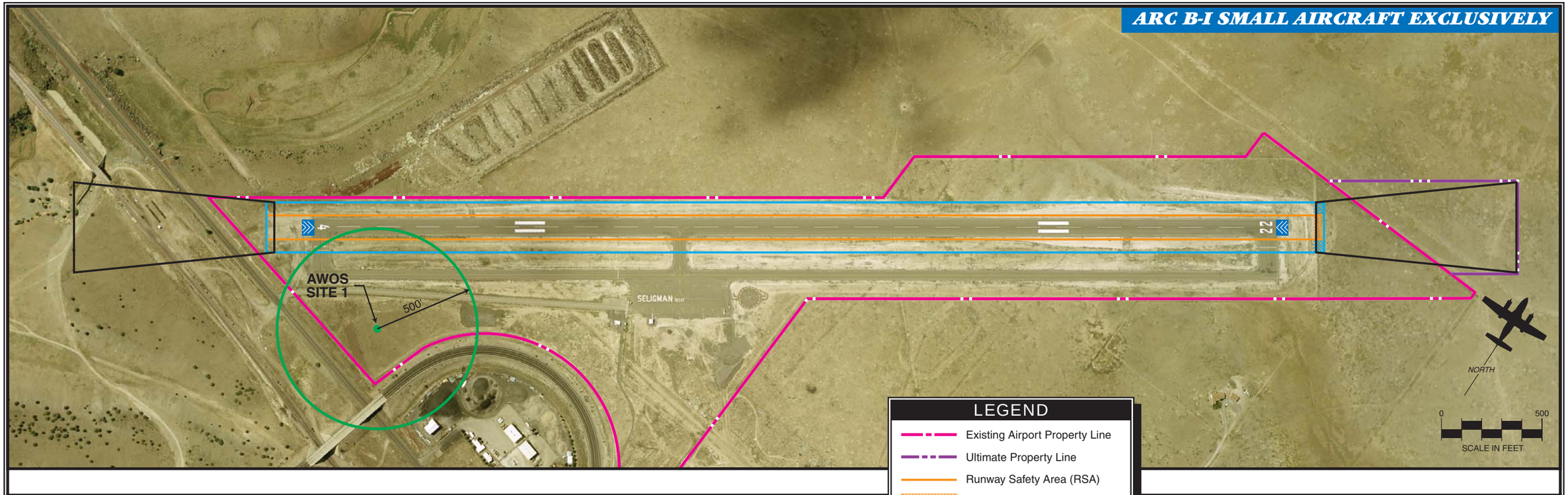
The exhibit also depicts a difference in the size of the runway protection zones (RPZ) for the two scenarios. The runway protection zone (RPZ) is a trapezoidal area centered on the runway and typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses, in order to enhance the protection of approaching aircraft as well as people and property on the ground.

The FAA does not necessarily require the fee simple acquisition of the RPZ area, but recommends that airports maintain positive control over development within the RPZ. It is preferred that the airport own the property through fee simple acquisition, however, avigational easements (providing control of designated airspace within the RPZ) can be pursued if fee simple purchase is not possible. It should be noted, however, that avigation easements can often cost nearly as much as the underlying land value and may not fully prohibit incompatible land uses from the RPZ. Also, the area encompassed by the RPZ envelops the required RSA, OFA, and areas needed for installation of approach lighting systems, all of which would be required for purchase.

The RPZ for both ends of the runway considers visual approach conditions or instrument approaches with “not lower than one-mile” visibility minimums. For small aircraft exclusively, each RPZ encompasses 8.035 acres. For full ARC B-I, each RPZ covers 13.770 acres. The southern RPZ falls in areas which will not likely be developed in the future, as it lies between Historic Route 66, a railroad, and I-40. For this reason, an avigation easement would be adequate. For the northern RPZ, however, consideration should be given to fee simple acquisition. Any potential approach in the future will likely be for Runway 22, as the area could be

02MP20-4B-1/6/04

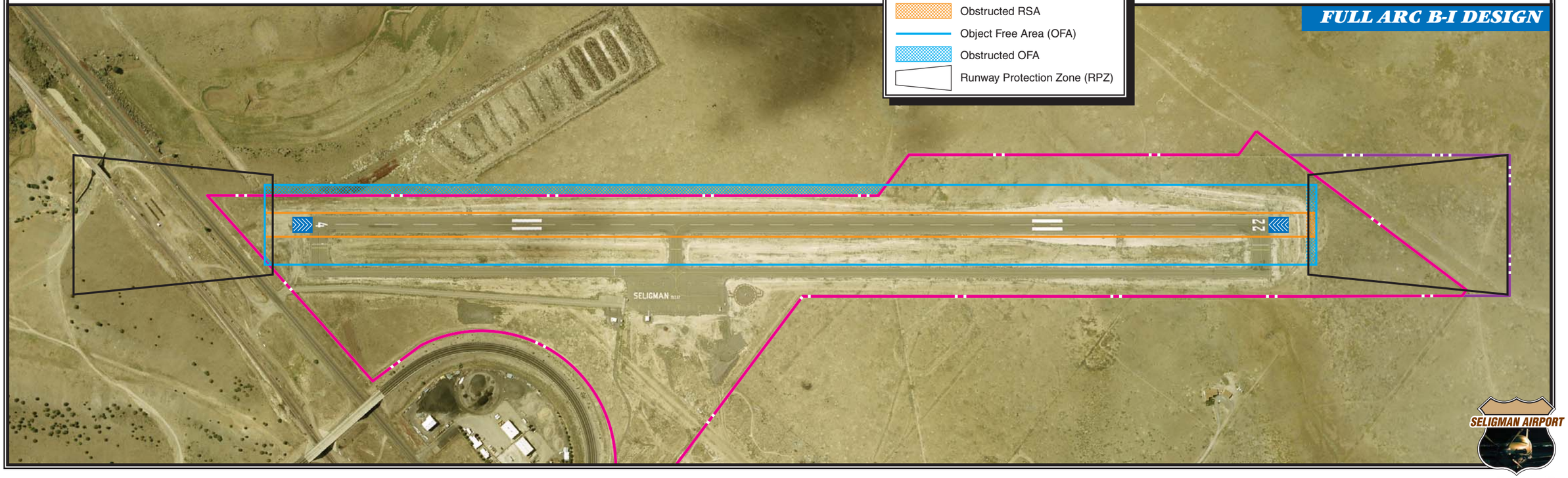
ARC B-I SMALL AIRCRAFT EXCLUSIVELY



LEGEND

- Existing Airport Property Line
- Ultimate Property Line
- Runway Safety Area (RSA)
- Obstructed RSA
- Object Free Area (OFA)
- Obstructed OFA
- Runway Protection Zone (RPZ)

FULL ARC B-I DESIGN



SELIGMAN AIRPORT

Exhibit 4B
AIRFIELD ALTERNATIVE 1
REMAIN ARC B-I DESIGN

developed for residential or other non-compatible purposes. Thus, the northern RPZ would be planned to be acquired fee simple in both scenarios.

Airfield Alternative 1 also considers the siting of an Automated Weather Observation System (AWOS). AWOS-III units provide the pilot with the airfield's current altimeter setting, wind direction and speed, temperature, dewpoint, density altitude, visibility, and cloud-height. The observations are broadcast to the pilot using an integral VHF radio or an existing navigational aid. Both scenarios depicted on **Exhibit 4B** consider siting the AWOS in the southwestern corner of the airport. This site is near the runway end and would have mostly unobstructed environs. The ADOT facilities may require the AWOS to be placed higher than normal to ensure that the sensors are not obstructed. Typically, a cleared radius of 500 feet is desired.

Advantages: Capital costs would be less for meeting design standards if the airfield would conform to small aircraft exclusively standards (versus full ARC B-I). In fact, the only capital costs with the small aircraft exclusively scenario would be land acquisition to provide for the northern RPZ, RSA, and OFA. Meeting full ARC B-I design would accommodate heavier aircraft within approach categories A and B.

Disadvantages: Conforming to ARC B-I standards could deter use of the airport by larger aircraft in the future. The airport may not be suitable for use by faster medical evacuation or other law enforcement aircraft.

AIRFIELD ALTERNATIVE 2

Airfield Alternative 2 considers airfield design conforming to ARC B-II design criteria. Shifting to ARC B-II design would require several improvements, as depicted on **Exhibit 4C**.

As presented in the previous chapter, Runway 4-22 would need to be extended to accommodate ARC B-II aircraft. Any future extension of the runway would need to be to the northeast, as Historic Route 66, a railroad, and I-40 are all constraints to southerly extensions. **Exhibit 4C** depicts a 1,900-foot extension. As a result, Runway 4-22 would measure 6,700 feet and would be fully capable of accommodating medical evacuation aircraft, as well as all other ARC B-II aircraft. The runway extension would also require extending parallel Taxiway A and adding a new entrance/exit taxiway as depicted.

Upgrading to ARC B-II design will also require meeting a higher level of safety standards. The OFA and RSA are wider and extend an additional 60 feet beyond each runway end. Obviously, the northern OFA and RSA would extend beyond airport property. The southern and western portions of the OFA, however, would also extend beyond airport property. In both cases, the FAA may grant an allowance or modification, as the areas outside the property line will not likely be developed. If possible, however, all attempts should be made to conform to standard. Thus, the County should make attempts to acquire property to the west, as has been done in the past.

This alternative considers siting the AWOS at the northeastern corner of the airport. This site is more remote than the previous alternative and would provide better reporting of the planned instrument runway (Runway 22). Also, there would be no obstructions to the sensors at this location.

Advantages: Airfield Alternative 2 would better suit regional needs, especially for medical evacuation or law enforcement purposes. The longer runway would serve the needs of B-II aircraft, including turboprop and small business jets. The AWOS site, though remote, would be situated at the end of the runway planned for an instrument approach.

Disadvantages: The costs of implementing this alternative will be far greater than the previous alternative. Extending the runway could require environmental study/ review and would likely need to be justified through a benefit-cost analysis.

LANDSIDE ALTERNATIVES

The orderly development of the airport terminal area can be the most critical, and probably the most difficult development to control on the airport. A terminal area development approach simply taking the short term path of least resistance can have a significant effect on the long term viability of an airport. Allowing development without regard to a functional, long term plan could result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of valuable space.

The following sections outline two landside development alternatives. It is important to note that a multitude of sub-alternatives, or tweaking of the two, could be developed. But for the sake of this plan, two alternatives will be shown. Keep in mind that the final plan could be a combination of both or a modification of one or both. The purpose of this analysis, however, is to present ideas than can start the process and stimulate thought. Also, both alternatives would provide facilities exceeding aviation demand projected in Chapter Two. It is always prudent to not only consider the 20-year planning envelope, but also extend the concept further to determine the ultimate potential of a plan.

LANDSIDE ALTERNATIVE A

The left side of **Exhibit 4D** depicts development of landside terminal facilities considering moderate growth, likely over a long period of time. This alternative would also conform to the needs of an ARC B-I airport. The alternative development scheme considers developing various-sized hangars to meet the needs of a variety of operators.

This alternative considers modifying the entrance road around the existing vault to provide access to hangars placed on the existing apron edge. As depicted, the alternative considers developing a terminal building adjacent to the existing restroom facility. A wash rack is proposed immediately south of the terminal building. The proposal also considers developing a fuel farm with immediate access to the

02MP20-4C-1/6/04

LEGEND

- Existing Airport Property Line
- Ultimate Property Line
- Ultimate Airfield Pavement
- Runway Safety Area (RSA)
- Obstructed RSA
- Object Free Area (OFA)
- Obstructed OFA
- Runway Protection Zone (RPZ)

NORTH

0 800 1600

SCALE IN FEET

Date of Photo: 5/25/03

SELIGMAN AIRPORT

Exhibit 4C
AIRFIELD ALTERNATIVE 2
UPGRADE TO ARC B-II DESIGN

02MP20-4D-5/4/04

ALTERNATIVE A

T-HANGARS
EXECUTIVE HANGAR
CONVENTIONAL HANGAR
TERMINAL
FUEL FARM
RELOCATED SEGMENTED CIRCLE/ WIND CONE
WASH RACK
SELIGMAN 5237

ALTERNATIVE B

LEGEND
- Existing Airport Property Line
- Ultimate Building
- Ultimate Arifield Pavement
- Ultimate Road/Parking

NORTH

0 200 400
SCALE IN FEET

Date of Photo: 5/25/03

WASH RACK
CONVENTIONAL HANGARS
TERMINAL
FUEL FARM
EXECUTIVE HANGARS
T-HANGARS
SELIGMAN 5237

SELIGMAN AIRPORT

Exhibit 4D
LANDSIDE ALTERNATIVES

southern apron edge. This location would be good for self-service fueling.

Two hangars are proposed to the north of the terminal building. The conventional hangar is 100 feet by 100 feet, while the executive hangar is shown at 60 feet by 60 feet. The conventional hangar would likely house an airport business such as a fixed base operation (FBO) or maintenance operation. It could also be utilized for bulk aircraft storage. The executive hangar could be utilized by a specialty operator or individual owning several aircraft. Two eight-unit T-hangar facilities are depicted at the northern pavement edge.

LANDSIDE ALTERNATIVE B

Exhibit 4D also depicts another potential development scheme for providing for future aviation demand at Seligman Airport. The most significant difference between this alternative and the previous Alternative B, considers the airport shifting to a B-II design. Airport Access Road would need to be modified under this alternative.

Alternative B also considers developing a terminal building adjacent but this time south of the existing restroom facility. Two 10,000-square-foot hangars (100 feet x 100 feet) are proposed to the north of the terminal building on the eastern apron edge.

This alternative considers developing four, 10-unit T-hangar facilities in the south-central portion of the terminal area. The alternative also considers three, 60-foot by 60-foot executive hangar facilities to the south, on a proposed expanded apron. A wash rack is proposed in the northern portion of the terminal area.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

Upon review of this report by the Planning Advisory Committee and County officials, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The proposed development plan for the airport must represent a means by which the airport can grow in a balanced manner, both on the airside as well as the landside, to accommodate forecast demand. In addition, it must provide (as all good development plans should) for flexibility in the plan to meet activity growth beyond the long term planning period. The remaining chapters will be dedicated to refining the basic concept into a final plan, with recommendations to ensure proper implementation and timing for a demand-based program.